

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Lake Goldsmith, Brookings County
2102-F-21-R-48
2015



Figure 1. Lake Goldsmith, Brookings County

Legal Description: T110N- R51W-Sec 9, 16

Location from nearest town: 1 mile north, 1 mile west of Volga, SD

Surface Area: 288 acres

Meandered (Y/N): Yes

OHWM elevation: no data

Outlet elevation: no data

Max. depth at outlet elevation: 9 feet

Observed water level: 6" low

Contour map available (Y/N): Yes

Watershed area: unknown acres

Shoreline length: 2.3 miles

Date set: NA

Date set: NA

Mean depth at outlet elevation: 6 feet

Lake volume: 1,826 acre-feet

Date mapped: unknown

DENR beneficial use classifications: (6) warm water marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation

Introduction

General

Lake Goldsmith is a small natural lake located near the town of Volga in Brookings County. The watershed consists of mostly cropland, which drains to the inlet located in the northwest corner of the lake. The outlet located on the northeast corner of the lake drains to the Big Sioux River.

Ownership of Lake and Adjacent Lakeshore Properties

Lake Goldsmith is listed as a meandered lake in the State of South Dakota Listing of Meandered Lakes. The South Dakota Department of Game, Fish and Parks (GFP) manages the fishery but does not own any land surrounding the lake.

Fishing Access

A public road right-of-way runs along the south shoreline of the lake. There are several spots along this road accessible to shore anglers and small boats can be launched on a sandy beach near the west end (Figure 1).

Water Quality and Aquatic Vegetation

Since 2007, water clarity in Lake Goldsmith has been generally poor, ranging from 30-89 cm (12-35 in) (Table 1). This explains why there is little submerged aquatic vegetation in the lake.

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Lake Goldsmith, Brookings County, 2006-2015.

Year	Water Temp °C (°F)	Secchi Depth cm (in)	Observations/Comments (algae, aquatic vegetation, water quality, etc.)
2015	23 (73)	88 (35)	Cattails
2014	22 (72)	56 (22)	No aquatic vegetation
2013	25 (77)	64 (25)	No aquatic vegetation
2011	23 (74)	76 (30)	Sago pondweed and cattail
2009	-- (--)	89 (35)	No aquatic vegetation
2007	26 (79)	30 (12)	No aquatic vegetation

Fish Community

Lake Goldsmith contains a fairly diverse fish community that is likely influenced by occasional connections to the Big Sioux River during flood events (Table 2).

Table 2. Fish species commonly found in Lake Goldsmith, Brookings County.

<i>Game Species</i>	<i>Other Species</i>
Walleye Yellow Perch Northern Pike Black Bullhead White Bass White Crappie Bluegill	White Sucker Common Carp Bigmouth Buffalo

Fish Management

Lake Goldsmith had a moderately-severe winterkill in 2014 (Table 3). Black bullhead and rough fish abundance does not seem to reach the high levels observed in similar waters. Fisheries management focuses on maintaining walleye and yellow perch fisheries through regular stocking (Table 4) but naturally-occurring populations of northern pike, white bass and white crappie have also provided some fishing opportunity in the past.

Table 3. Fish kill history for Lake Goldsmith, Brookings County.

<i>Year</i>	<i>Severity</i>	<i>Comments</i>
2014	Moderate	Winterkill – dead NOP, WHB, WHS, COC, WAE, YEP, BLB
1997	Severe	Winterkill similar to the one in 1994
1994	Severe	Winterkill, most game fish were killed

Table 4. Stocking history for Lake Goldsmith, Brookings County, 2006-2015.

<i>Year</i>	<i>Number</i>	<i>Species</i>	<i>Size</i>
2006	31,200	Walleye	Fingerling
2008	30,000	Walleye	Fingerling
2009	3,837	Walleye	Large Fingerling
2010	32,640	Walleye	Fingerling
2011	145,920	Yellow Perch	Fingerling
	2,280	Yellow Perch	Adult
	172	Walleye	Large Fingerling
2012	1,350	Walleye	Juvenile
2014	300,000	Walleye	Fry
2015	20,480	Walleye	Fingerling

Methods

Lake Goldsmith was sampled on June 30-July 1, 2015 with three overnight gill nets. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ($\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 in) monofilament netting.

Results and Discussion

Net Catch Results

Black bullheads were the most abundant species sampled in the gill nets followed by yellow perch and walleye (Table 5). Only six species were sampled in gill nets this year and only eight species in the last ten years (Table 7).

Table 5. Total catch from three overnight gill nets set in Lake Goldsmith, Brookings County, June 30-July 1, 2015.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE¹</i>	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Black Bullhead	36	50.0	12.0	± 10.9	7.5	4	0	--
Yellow Perch	21	29.2	7.0	± 2.7	4.0	43	33	104
Walleye	6	8.3	2.0	± 0.7	4.9	--	--	--
Northern Pike	5	6.9	1.7	± 0.4	2.0	--	--	--
White Sucker	3	4.2	1.0	± 0.7	3.4	--	--	--
Common Carp	1	1.4	0.3	± 0.4	0.5	--	--	--

*10 years (2006-2015)

Table 6. CPUE by length category for selected species sampled with gill nets in Lake Goldsmith, Brookings County, June 30-July 1, 2015.

<i>Species</i>	<i>Substock</i>	<i>Stock</i>	<i>S-Q</i>	<i>Q-P</i>	<i>P+</i>	<i>All sizes</i>	<i>80% C.I.</i>
Black Bullhead	2.7	9.3	9.0	0.3	--	12.0	± 10.9
Yellow Perch	--	7.0	4.0	0.7	2.3	7.0	± 2.7
Walleye	2.0	--	--	--	--	2.0	± 0.7
Northern Pike	0.3	1.3	0.7	0.7	--	1.7	± 0.4
White Sucker	--	1.0	--	--	1.0	1.0	± 0.7
Common Carp	--	0.3	0.3	--	--	0.3	± 0.4

Length categories can be found in Appendix A.

¹ See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Table 7. Gill-net CPUE for selected fish species sampled in Lake Goldsmith, Brookings County, 2006-2015.

Species	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bigmouth Buffalo		1.0		--		--		0.3	0.3	--
Black Bullhead		16.3		--		0.7		1.0	14.7	12.0
Common Carp		1.3		0.3		0.3		0.7	0.3	0.3
Northern Pike		1.0		1.0		3.7		3.0	1.7	1.7
Walleye		15.3		3.0		3.7		5.3	--	2.0
White Bass		0.3		2.0		--		--	--	--
White Sucker		9.3		2.3		1.3		2.7	4.0	1.0
Yellow Perch		1.0		5.0		4.3		1.7	5.0	7.0

Walleye

Management Objective

- to maintain a walleye population with a total gill-net CPUE of at least 10

Management Strategy

- stock small walleye fingerlings at the rate of 70/acre (20,160) as needed to achieve the management objective

Only six walleyes were sampled in the gill nets this year (Table 8) and all were less than stock length (25 cm, 10 in). They were probably stocked as fry in 2014 (Table 9). Despite stockings in seven of the last 10 years, the management objective has only been achieved once. However, brief periods of good walleye fishing occasionally occur.

Table 8. CPUE, PSD, RSD-P and mean Wr for all walleye sampled with gill nets in Lake Goldsmith, Brookings County, 2006-2015. Stocked years are shaded.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
CPUE		15.3		3.0		3.7		5.3	0.0	2.0
PSD		33		--		64		31	--	--
RSD-P		2		--		0		6	--	--
Mean Wr		92		--		93		94	--	--

Table 9. Walleyes stocked into Lake Goldsmith, Brookings County, 2006-2015.

Year	Number	Size
2006	31,200	Fingerling
2008	30,000	Fingerling
2009	3,837	Large Fingerling
2010	32,640	Fingerling
	172	Large Fingerling
2012	1,350	Juvenile
2014	300,000	Fry
2015	20,840	Fingerling

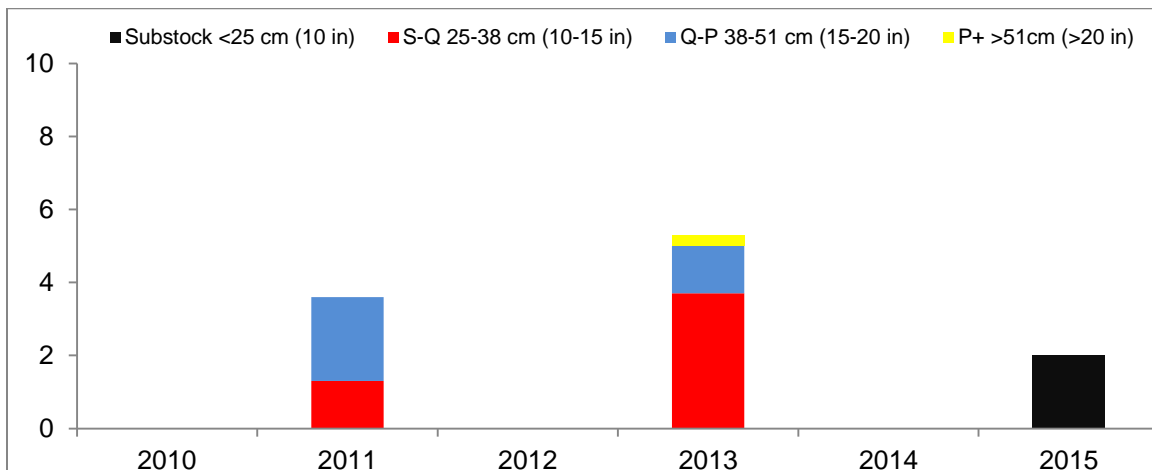


Figure 2. CPUE by length category for walleye sampled with gill nets in Lake Goldsmith, Brookings County, 2010-2015.

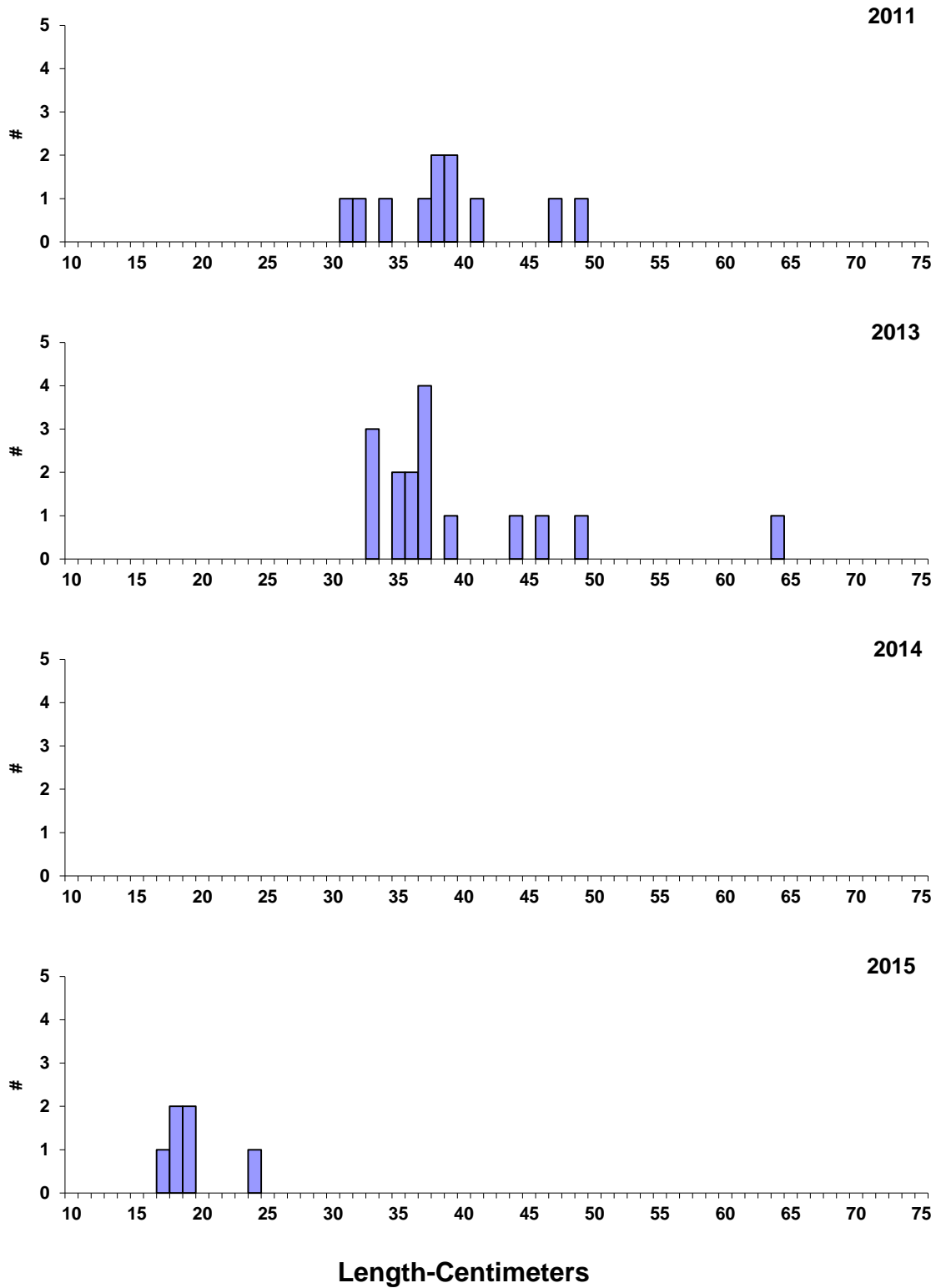


Figure 3. Length-frequency histograms for walleye sampled with gill nets in Lake Goldsmith, Brookings County, 2011, 2013, 2014, 2015.

Yellow Perch

Management Objective

- maintain a yellow perch population with a total gill-net CPUE of at least 10

Management Strategies

- stock small yellow perch fingerlings marked with oxytetracycline (OTC) at the rate of 500/acre (144,000) as needed and evaluate stocking success

Yellow perch gill-net CPUE rose slightly in 2015 (Table 10), but remains well below the management objective. A review of historic records revealed that the last time yellow perch CPUE exceeded 10 fish per gill net was back in the early 1990's. The 2011 fingerling and adult stockings (Table 11) did not increase abundance, and it is interesting that no fish longer than 25 cm (10 in) were sampled from 2009 to 2014. However, seven out of 21 in 2015 were over 25 cm (10 in) (Figures 4, 5). Yellow perch management in Lake Goldsmith should be terminated if small fingerling stocking does not achieve the management objective in the next four years.

Table 10. CPUE, PSD, and mean Wr for all yellow perch sampled with gill nets in Goldsmith Lake, Brookings County, 2006-2015. Stocked years are shaded

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
CPUE		1.0		5.0		4.3		1.7	5.0	7.0
PSD		--		57		23		--	60	43
RSD-P		--		0		0		--	0	33
Mean Wr		--		104		106		--	106	104

Table 11. Yellow perch stocked into Lake Goldsmith, Brookings County, 2006-2015.

Year	Number	Species	Size
2011	145,920	Yellow Perch	Fingerling
	2,280	Yellow Perch	Adult

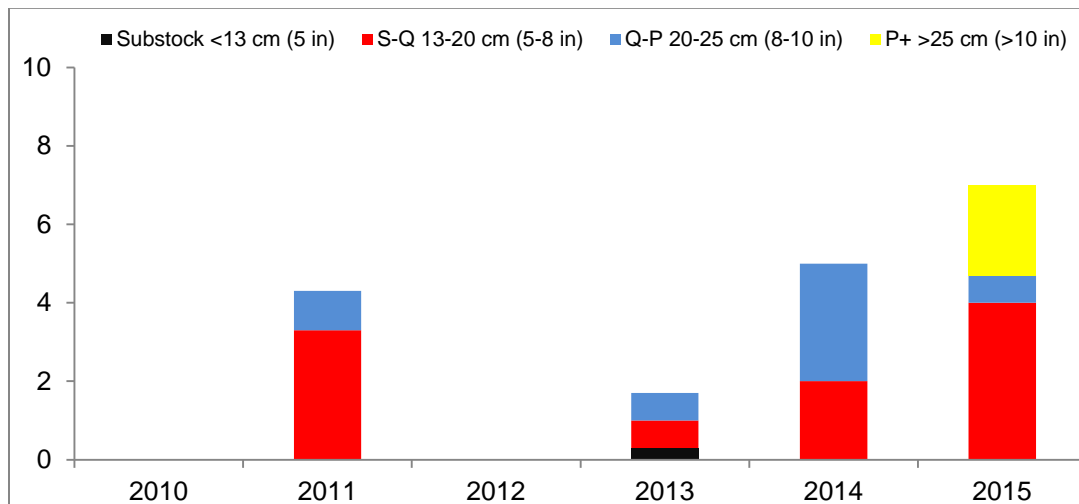
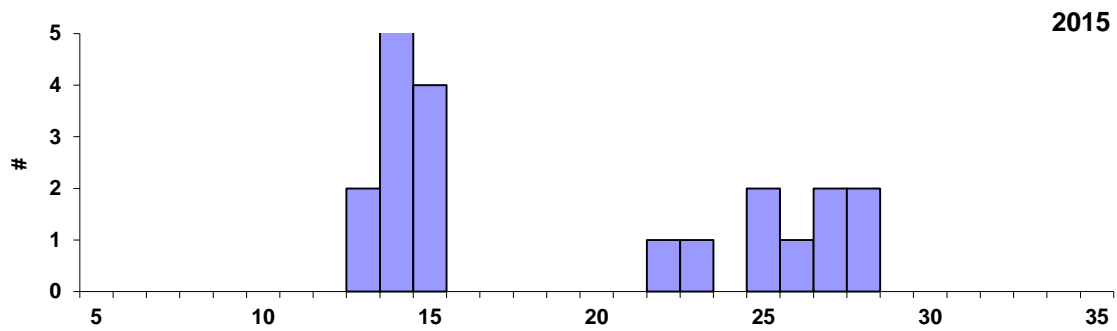
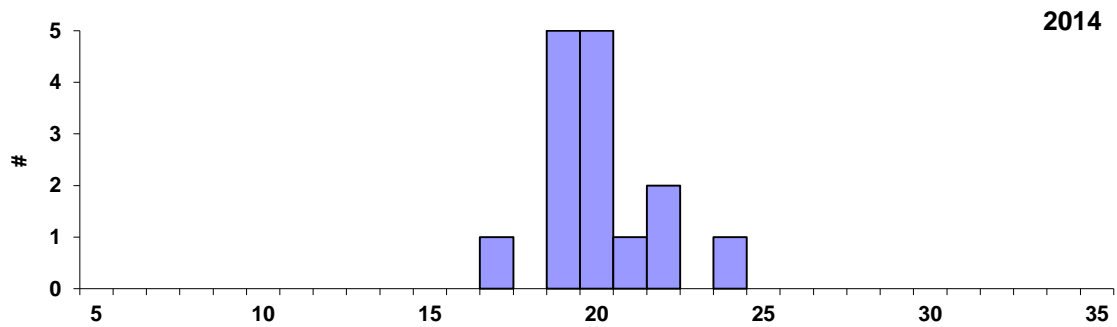
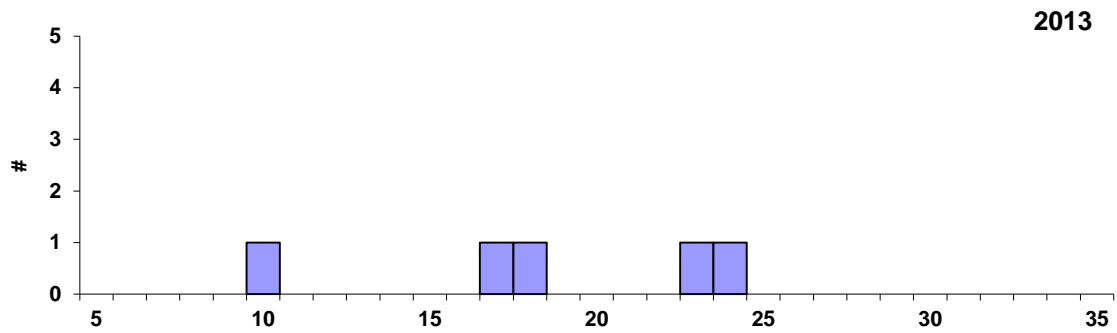
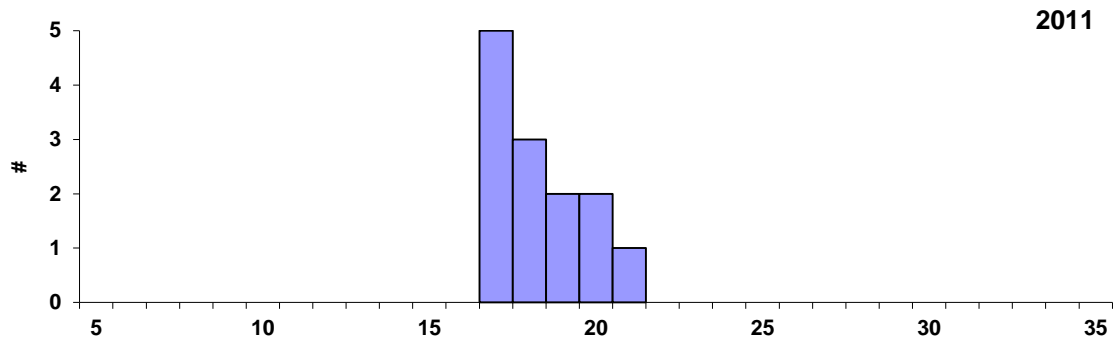


Figure 4. CPUE by length category for yellow perch, sampled with gill nets in Lake Goldsmith, Brookings County, 2010-2015.



Length-Centimeters

Figure 5. Length-frequency histograms for yellow perch sampled with gill nets in Lake Goldsmith, Brookings County, 2011, 2013, 2014, and 2015.

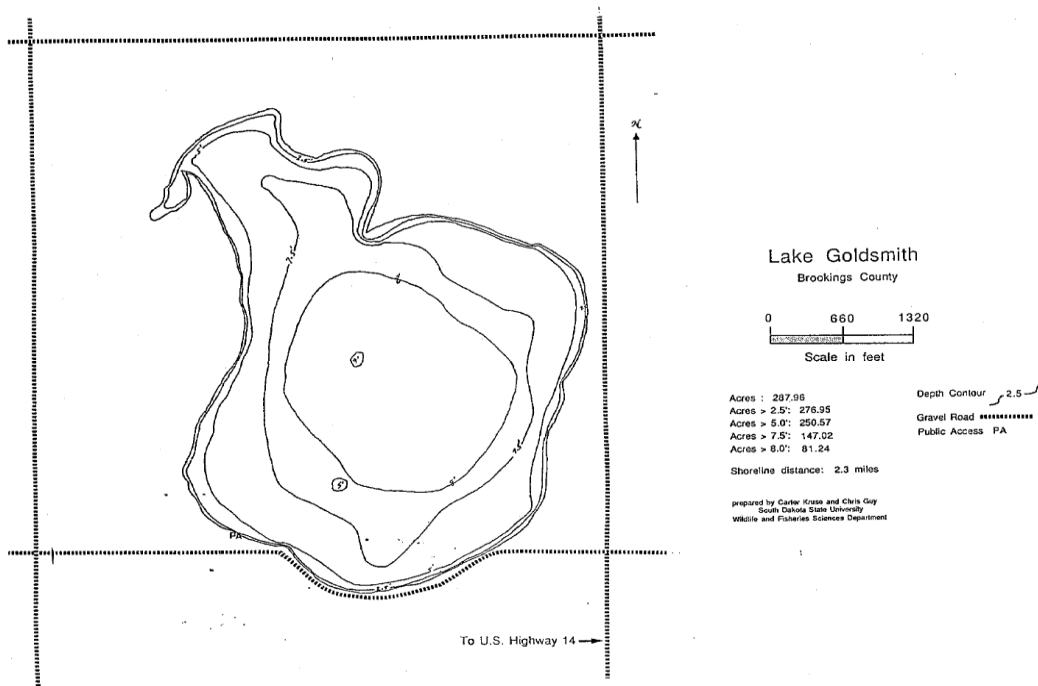


Figure 6. Contour map of Lake Goldsmith, Brookings County. (insert appropriate lake contour map above as in example)

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (Inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.